

Findings on Duke Energy's Power Plant Cost Recovery Terms and Implications for South Carolina Ratepayers

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Executive Summary

In the aftermath of the VC Summer abandonment, South Carolina's electric utilities have a unique opportunity to correct course and take advantage of more affordable energy resources for the benefit of ratepayers. Purchasing clean, low-cost energy from privately-funded, lower-risk independent power producers is a better choice for South Carolina's future than more ratepayer-funded, monopoly-owned power plants.

However, financing any large capital investment requires long-term contracted cash flows. The investor-owned utilities (IOUs) understand this better than most businesses, because their business model depends on their ability to recover the cost of their invested capital over an extended period of time (their "cost recovery term"), without which they could not build a single power plant.

To demonstrate this point, this document summarizes two key findings:

- Duke Energy recovers the capital cost of its power plants over multiple decades from ratepayers. The cost recovery term for power plants owned by Duke Energy Carolinas and Duke Energy Progress (Duke's regulated utilities with SC service territory) ranges from 25 years for its own solar plants, 40 to 53 years for its natural gas plants, and 60 years for its nuclear plants.
- Duke's non-regulated solar projects have an average contract length of nearly 20 years. The average PPA term for all solar power plants owned by Duke Renewables (a separate Duke business unit) is 18.5 years – with a minimum length of 15 years and ranging as high as 30 years.

These findings demonstrate that power plants of any type and scale require predictable long-term contracts to be financed by private investors, whether by IOUs or by private investors in independent power plants. However, in contrast to IOU's multi-decade cost recovery terms, South Carolina's independent power producers are requesting PPA terms of only fifteen years¹ – the widely recognized market standard.²

¹ SC's Energy Freedom Act (S.890/H.4796) would establish a 15-year fixed price PPAs for independent qualifying facilities.

² S&P Global's database of more than 900 power plants (built under PURPA or negotiations with utilities and other buyers) finds that only 2% were built with contract terms of 10 years or less – fewer than 20 projects from 2007 to mid-2017.

Summary of Duke Energy's Cost Recovery Terms for NC/SC Generation Units

As part of Duke Energy's recent testimony to support its active North Carolina rate cases, the company specifies "Depreciable Life Spans" for generation units. According to Dr. Ben Johnson, a consulting economist and utility regulation expert, "The depreciation life essentially determines over how many years the cost of the plant is recovered from customers (how long it remains in the rate base)."³ In other words, unless otherwise explicitly stated, it can be reasonably assumed that cost recovery terms for Duke Energy's generation units are approximately equivalent to their depreciation life spans.

In summary:⁴

Table 1: Depreciable Life Span of Generation Units Owned by DEC/DEP		
	Duke Energy Carolinas (DEC)	Duke Energy Progress (DEP)
Gas combined cycle units	40 years	40 years
Gas combustion turbines	40 to 41 years	40 to 53 years
Steam base-load units	36 to 69 years	52 to 63 years
Nuclear units	60 years	60 years
Solar units	25 years	25 years

Summary of Duke Renewables' Solar Project PPA Terms

According to Duke Renewables, as of late 2017 it owned and operated 600 MW of utility-scale solar projects across the United States.⁵

The PPA terms for these projects are summarized as follows:⁶

Table 2: PPA Terms for Solar Projects Owned by Duke Renewables	
Number of Projects	PPA Term
18 projects	15 years
15 projects	20 years
6 projects	25 years
1 project	30 years
3 projects	Unconfirmed
Summary:	
Average PPA Term:	18.75 years
Minimum PPA Term:	15 years

³ Total Revenue Requirement = (Rate of Return * (Rate Base = Original Cost - Accumulated Depreciation)) + Op. Ex + annual depreciation + taxes. See EEI 2012 ([link](#)) and NARUC training materials ([link](#)).

⁴ Note: the depreciable life spans indicated here (and their relationship to cost recovery terms) are applicable to Duke's regulated businesses, DEC and DEP – not to its non-regulated business, Duke Renewables. The depreciable life spans indicated here for solar are for DEC and DEP's solar projects, which are separate from Duke Renewables.

⁵ Duke Renewables Solar Projects Factsheet. 2017. https://www.duke-energy.com//_media/pdfs/our-company/solar-power-projects-fact-sheet.pdf

⁶ Note: the projects summarized here are owned by Duke Renewables, a non-regulated business unit of Duke that is separate from DEC and DEP. Duke's regulated businesses, including DEP, also own solar projects.

APPENDIX: DETAILS AND CITATIONS

Cost Recovery Terms for DEC/DEP Generation Units

Gannet Flemming conducted Depreciation Studies dated 12/31/2016 that were included in the testimony of Witness Doss in both the DEC and DEP rate cases. The links below take you to the depreciation studies as filed in their respective dockets.

DEC: <http://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=3600b0cb-3234-4a99-8897-0081610a9cf1>

- Chart can be found on PP. III-6 through III-7 (PP 39-40 of 286 in the PDF)

DEP: <http://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=2dd3d981-5509-42b4-80d1-c7cdd4dc68f4>

- Chart can be found on PP. III-6 through III-7 (PP. 76-77 of 627 in the PDF)

From Pages III-5 through III-6 of the DEC study: "The depreciable life span estimate for most steam, base-load units is 36 to 69 years, which is within the typical range of life spans for such units. The life span for nuclear units is approximately 60 years, and is consistent with the license dates for each unit. The depreciable life span for hydraulic units is 67 to 148 years which corresponds to the license or relicense dates. A life span of 40-41 years was estimated for the combustion turbines. These life span estimates are typical for combustion turbines which are used primarily as peaking units. The combined cycle units are relatively new units with a commonly used 40-year life span estimate. The large solar facilities have recently been constructed and will have a 25-year life span."

From Pages III-5 through III-6 of the DEP study: "The depreciable life span estimate for most steam, base-load units is 52 to 63 years, which is within the typical range of life spans for such units. With the exception of the Asheville units, these life spans represent the expected depreciable life of each facility under their current configuration. The Company plans to retire the Asheville steam units in 2019. The Company's proposal is to recover the costs of this facility over a 10-year period. For the other facilities, future capital expenditures can extend a facility's depreciable life, however, such changes to depreciable life would not be prudent until the capital expenditures are actually put into plant in service. The life span for nuclear units is approximately 60 years, and is consistent with the license dates for each unit. The depreciable life span for hydraulic units is 104 to 143 years which corresponds to the license or relicense dates. A life span of 40-53 years was estimated for the combustion turbines. These life span estimates are typical for combustion turbines which are used primarily as peaking units. The combined cycle units are relatively new units with a commonly used 40-year life span estimate. All solar facilities have recently been constructed and will have a 25-year life span."

Duke's most recent rate case in South Carolina was Docket 2016-227-E. A depreciation study was also attached to Witness Doss' testimony. This study is dated 12/31/2010. Alliance Consulting Group conducted the study. Appendix D-2 begins on Pg. 141 of 194 in the PDF and contains a table with column titled "Retirement date used in latest approved study". The lowest estimated service life is 40 years.

Link: <https://dms.psc.sc.gov/Attachments/Matter/dc49f517-5ed9-4364-88ab-53d6013aeba8>

PPA Terms for Solar Projects Owned by Duke Renewables⁷

Solar Project	State	MW ac	PPA Yrs	In-Service Date	Offtake
Blue Wing	TX	14	30	2010	CPS Energy
Sunset Reservoir	CA	4.5	25	2010	San Francisco Public Utilities Commission
Ajo	AZ	5	25	2011	Arizona Public Service Company
Bagdad	AZ	15	25	2011	Arizona Public Service Company
Seville II	CA	30	25	2015	Imperial Irrigation District
Victory	CO	13	25	2016	Intermountain Rural Electric Association
Caprock	NM	25	25	2016	Western Farmers Electric Cooperative
Stanton	FL	6	20	2011	Orlando Utilities Commission
Murfreesboro	NC	5	20	2011	NCEMC
Black Mountain	AZ	10	20	2012	Unisource Energy Services
Gato Montes	AZ	6	20	2012	Tucson Electric Power Company
Highlander I & II	CA	21	20	2013	Southern California Edison
Pumpjack	CA	20	20	2014	Southern California Edison
Wildwood	CA	20	20	2014	Southern California Edison
Capital Partners, Phase I	NC	20	20	2014	American University, GWU
Capital Partners, Phase II	NC	33.5	20	2014	American University, GWU
Conetoe	NC	80	20	2015	Corning, Inc.; Lockheed Martin
Seville I	CA	20	20	2015	San Diego Gas & Electric
Longboat	CA	20	20	2016	Southern California Edison
Rio Bravo I	CA	20	20	2016	Southern California Edison
Rio Bravo II	CA	20	20	2016	Southern California Edison
Wildwood II	CA	15	20	2016	Southern California Edison
Washington Whitepost	NC	12.5	15	2012	NC Eastern Municipal Power Agency
Millfield	NC	5	15	2013	NC Eastern Municipal Power Agency
Washington Airport	NC	5	15	2013	NC Eastern Municipal Power Agency
Dogwood	NC	20	15	2013	Dominion NC Power
Windsor Cooper Hill	NC	5	15	2013	Dominion NC Power
Bethel Price	NC	5	15	2013	Dominion NC Power
Halifax	NC	20	15	2014	Dominion NC Power

⁷ All information collected from publicly available sources, including CPCNs and media publications.

Battleboro	NC	5	15	2015	Dominion NC Power
Sunbury	NC	5	15	2015	Dominion NC Power
Tarboro	NC	5	15	2015	Dominion NC Power
Hertford	NC	5	15	2016	Dominion NC Power
Long Farm	NC	5	15	2016	Dominion NC Power
Winton	NC	5	15	2016	Dominion NC Power
Garysburg	NC	5	15	2016	Dominion NC Power
Gaston	NC	5	15	2016	Dominion NC Power
Woodland	NC	5	15	2016	Dominion NC Power
Seaboard	NC	5	15	2016	Dominion NC Power
River Road	NC	5	15	2016	Dominion NC Power
Everetts Wildcat	NC	5	?	2014	Dominion NC Power
Creswell	NC	14	?	2015	Dominion NC Power
Shawboro	NC	20	?	2015	Dominion NC Power